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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/763,321

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Artur Hogele

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03/22/2005

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EXAMINER

SCHWARTZ, JORDAN MARC

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/763,321

Applicant(s)

HOGELE ET AL.

Examiner

Jordan M. Schwartz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/26/04, 1/26/04</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

Claims 1 and 10 (and dependent claims 2-9 and 11-12) are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 1 and 10, that part of the claim stating "said lens being made of a single-axis, double refracting material defining an optical crystal axis" renders the claims vague and indefinite. Specifically, applicant has not claimed a crystal and therefore claiming "defining a crystal axis" creates the lack of clarity. It is not clear if applicant is claiming "said lens being made of a single-axis, double refracting crystalline material defining an optical crystal axis" (which is the assumed meaning for purposes of examination) or if the intended meaning is "further comprising a crystal defining a crystal axis and said lens being made of a single-axis, double refracting material having said single axis being aligned with said optical crystal axis (i.e. the double-refracting material is not necessarily crystal but has its axis aligned with a crystal material within the optical arrangement) and the lack of clarity renders the claims vague and indefinite.

With further reference to claim 10, that part of the claim stating "one of said illumination system and said projection objective including an optical

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arrangement; and said optical arrangement including...the light of said light beam being polarized either tangentially to said optical axis or radially with respect to said optical axis:" renders the claim vague and indefinite based upon what is disclosed within the specification and Figures. Specifically, the specification and Figure 1 discloses "11" i.e. the resonator providing the claimed polarization. Nothing within the specification and Figures disclose either the illumination system or the projection objective as providing the claimed polarization and therefore it is not clear if applicant meant to claim the microlithographic projection exposure system including an optical arrangement (the assumed meaning for purposes of examination i.e. not specifically the illumination system and the projection objective including the optical arrangement) or if applicant meant to claim a resonator to provide the claimed polarization and one of the illumination system and the projection objective including the lens of double-refractive material or if some other meaning is intended and the lack of clarity renders the claim vague and indefinite.

With further reference to claim 10 applicant is claiming a UV light source and an illumination system arranged downstream of the UV light source which renders the claim vague and indefinite. Specifically, within the specification, applicant describes "1" of Figure 1 as a light source and describes "2" of Figure 1 as "an illumination system" however, "2" of Figure 1 comprises light mixers, apertures, reticle masking etc but does not contain a light source and therefore it is not clear as to what applicant means by an "illumination system" if the system is not providing illumination. Therefore, it is not clear as to what would constitute

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an illumination system if applicant's specification discloses that it does not require a light source and therefore the claimed illumination system arranged downstream of the light source renders the claim vague and indefinite. If specific structure or elements downstream of the light source are intended as limitations then they should be so claimed.

Claim Objections

Claim 6 is objected to because of the following informality: "made of a different material than that first material" should be corrected to "made of a different material than that of said first material" to correct an apparent inadvertent error. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-7, and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Schuster patent number 6,597,498.

Schuster'498 reads on these claims by disclosing the limitations therein including the following: an optical arrangement including a light source for generating a light beam along the optical axis (Figure 1, "1", column 3, line 45); the light of the beam being polarized tangential to the optical axis (column 2, line 65 to column 3, line 5, column 3, line 58); and a lens (Figure 1, "31" or "51"). The

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optical arrangement will inherently have a plane i.e. an infinite number of planes perpendicular to the optical axis and therefore lens "31" or "51" can inherently be considered mounted next to one of these planes. Schuster'498 further discloses the lens being made of a single-axis double refracting crystalline material (the assumed meaning, Figure 1, "31" or "51", column 2, line 65 to column 3, line 5, column 3, line 64 to column 4, line 10 and MgF2 i.e. single-axis material); the optical crystal axis being aligned parallel to the optical axis (column 2, line 65 to column 3, line 17, column 4, lines 8-33 i.e. if the crystal axis is perpendicular to the longitudinal dimension of the rod then in Figure 1 it will be oriented in the direction from the top to the bottom of the page which is parallel to the direction of the optical axis when the light travels in the direction from lens 31 to wafer "6"). Schuster'498 further discloses the single-axis double refracting material as MgF2 (column 2, line 65 to column 3, line 21, column 4, line 8); the plane as a pupillary plane (Figure 1 in which the plane can be considered as the opening just below lens "31" or just above lens "51"); the arrangement further comprising a second lens made of a different material (Figure 1 lens "51", i.e. "especially" MgF2 and therefore it can be made from a different material other than MgF2); the second lens material as a crystal (column 3, line 66 to column 4, line 10); a UV light source (column 3, line 50); an illumination system downstream of the light source (Figure 1, "3", column 3, line 64); and the illumination system or the projection objective comprising the claimed double-refracting lens (Figure 1, either lens "31" or "51").

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerhard publication number 2004/0240073 in view of Schuster'498.

Gerhard discloses the limitations therein including the following: an optical arrangement including a light source for generating a light beam along the optical axis (Figure 1, "1", paragraph 0018); the light of the beam being polarized radially to the optical axis (Figure 1, "5", paragraph 0019); an optical element made of a single-axis double refracting crystalline material (the assumed meaning, Figure 2, "14", paragraph 0021 i.e. will inherently be double refracting since the element is being made of MgF₂ crystal similar to that of the claimed invention); the optical crystal axis being aligned parallel to the optical axis (paragraph 0021). The optical arrangement will inherently have a plane i.e. an infinite number of planes perpendicular to the optical axis and therefore optical element "14" can inherently be considered mounted next to one of these planes. Gerhard further discloses a UV light source (paragraph 0018); an illumination system downstream of the light source (to the extent this term is understood i.e. either "4" or "6" or "7" of Figure 1); and the single-axis double refracting material within a projection objective (Figure 2, paragraph 0021). Gerhard discloses as is set forth above but does not

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specifically disclose the optical element as a lens and being made of MgF₂.

Schuster'498 teaches that when a single-axis double refracting crystal material is being used within an optical element of a projection lens system, that the optical element can be in the form of a lens of MgF₂ to provide additional desired refraction of the light (column 1, lines 9-60). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the crystal optical element of Gerhard as a lens made of MgF₂ material since Schuster'498 teaches that when a single-axis double refracting crystal material is being used within an optical element of a projection lens system, that the optical element can be in the form of a lens of MgF₂ to provide additional desired refraction of the light. Gerhard further discloses the optical element arranged next to a pupillary plane (paragraph 0023); and a second lens made of a different material (paragraph 0020 i.e. any of the lenses of Figure 2).

Claims 1-2, 6, and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Totzeck publication number 2004/0184019 in view of Schuster'498.

Totzeck discloses the limitations therein including the following: an optical arrangement including a light source for generating a light beam along the optical axis (Figure 1, paragraph 0056); the light of the beam being polarized radially to the optical axis (claim 21); an optical element made of a single-axis double refracting crystalline material (paragraph 0071 i.e. will inherently be double refracting since the element is disclosed as birefringent); the optical crystal axis being aligned parallel to the optical axis (paragraph 0071). The optical

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arrangement will inherently have a plane i.e. an infinite number of planes perpendicular to the optical axis and therefore optical element "30" can inherently be considered mounted next to one of these planes. Totzeck further discloses a UV light source (paragraph 0056); an illumination system downstream of the light source (to the extent this term is understood Figure 1, "4", paragraph 0056); and the single-axis double refracting material within a projection objective (paragraph 0056). Totzeck discloses as is set forth above but does not specifically disclose the optical element as a lens. Schuster'498 teaches that when a single-axis double refracting crystal material is being used within an optical element of a projection lens system, that the optical element can be in the form of a lens to provide additional desired refraction of the light (column 1, lines 9-60). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the crystal optical element of Totzeck as a lens since Schuster'498 teaches that when a single-axis double refracting crystal material is being used within an optical element of a projection lens system, that the optical element can be in the form of a lens to provide additional desired refraction of the light. Totzeck further discloses the optical material as MgF₂ (paragraph 0105); and a second lens made of a different material (any of the lenses of Figure 1).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuster'498 in view of Steffens patent number 6,856,642.

Schuster'498 discloses as is set forth above including the light source as a laser (column 3, line 50) and the light being polarized tangentially (column 2, line

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65, column 3, line 58) but does not specifically disclose a resonator to couple out the tangentially polarized light. Steffens teaches that when using a laser light source and changing the polarization state of the light, it is desirable to use a resonator as a coupling device for the purpose of coupling the polarized light into a desired path. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the optical system of Schuster'498 as further comprising a resonator to couple the polarized light since Steffens teaches that when using a laser light source and changing the polarization state of the light, it is desirable to use a resonator as a coupling device for the purpose of coupling the polarized light into a desired path.

Allowable Subject Matter

Claims 4 and 8-9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: with respect to the allowable subject matter, none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103. Specifically, with reference to claim 4, none of the prior art either alone or in combination, disclose or teach of the claimed optical arrangement specifically including, as the distinguishing feature in combination with the other limitations, the claimed lens made of a single-axis, double refracting material with a numerical aperture of up to 0.1. Specifically, with reference to claims 8-9, none of the prior art either alone

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or in combination, disclose or teach of the claimed optical arrangement specifically including, as the distinguishing feature in combination with the other limitations, the claimed second lens material as crystal wherein said crystal is either CaF₂ or BaF₂.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jordan M. Schwartz whose telephone number is (571) 272-2337. The examiner can normally be reached on Monday to Friday (8:00-5:30), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached at (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Jordan M. Schwartz

Primary Examiner

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March 16, 2005